



# UNITED STATES PATENT AND TRADEMARK OFFICE

*Ken*  
UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/605,849	10/30/2003	Bette L. Bergman Reuter	BUR920030061US1	2848
29154 7590 04/02/2007 FREDERICK W. GIBB, III Gibb & Rahman, LLC 2568-A RIVA ROAD SUITE 304 ANNAPOLIS, MD 21401			EXAMINER LIN, SUN J	
			ART UNIT	PAPER NUMBER
			2825	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		04/02/2007	PAPER	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	10/605,849		BERGMAN REUTER ET AL.	
	<b>Examiner</b>		<b>Art Unit</b>	
	Sun J. Lin		2825	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 30 October 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 8-28 is/are allowed.
- 6) ☒ Claim(s) 1-7 and 29-35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 October 2003 and 29 June 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/30/03, 3/22/04</u> .                                       | 6) <input type="checkbox"/> Other: _____                          |

### DETAILED ACTION

1. This office action is in response to application 10/605,849 filed on 10/30/2003.  
Claims 1 – 35 remain pending in the application.

#### *Drawing Objections*

2. Drawings are objected to because of following informalities:  
Fig. 1, lines & numbers are nor uniformly thick and well defined, and letters are not clear and not readable, per 37 CFR 1.84(I).  
Fig. 2, lines & numbers are nor uniformly thick and well defined, and letters are not clear and not readable, per 37 CFR 1.84(I).  
Fig. 4, solid black shading shown is not permitted, per 37 CFR 1.84 (m).

Appropriate correction is required.

#### *Claim Objections*

3. Claims listed below are objected to because of the following informalities:  
Claim 1, line 9, before “extracting” insert **—preliminary—**.  
Claim 1, line 15 – 16, change “defect vector” to **—defect vectors—**.  
Claim 3, line 2, change “process” to **—said feature vectors—**.  
Claim 3, line 3, after “index” insert **—of feature vectors—**.  
Claim 3, line 4, change “features” to **—feature—**.  
Claim 4, line 2, change “process” to **—said feature vectors—**.  
Claim 6, line 1, before “extracting” insert **—preliminary—**.  
Claim 6, line 4, before “extracting” insert **—preliminary—**.  
Claim 7, line 1, delete **—process of—**.  
Claim 8, line 10, before “extracting” insert **—preliminary—**.  
Claim 8, line 17 – 18, change “defect vector” to **—defect vectors—**.  
Claim 10, line 2, change “process” to **—said feature vectors—**.  
Claim 10, line 3, after “index” insert **—of feature vectors—**.  
Claim 10, line 4, change “features” to **—feature—**.  
Claim 11, line 2, change “process” to **—said feature vectors—**.  
Claim 13, line 1, before “extracting” insert **—preliminary—**.  
Claim 13, line 4, before “extracting” insert **—preliminary—**.

Art Unit: 2825

- Claim 14, line 1, delete **—process of—**.
- Claim 15, line 8, before “each” delete **—a—**.
- Claim 15, line 10, change “said windows” to **—said each window—**.
- Claim 15, line 13, before “extracting” insert **—preliminary—**.
- Claim 15, line 24 – 25, change “defect vector” to **—defect vectors—**.
- Claim 17, line 2, change “process” to **—said feature vectors—**.
- Claim 17, line 3, after “index” insert **—of feature vectors—**.
- Claim 17, line 4, change “features” to **—feature—**.
- Claim 18, line 2, change “process” to **—said feature vectors—**.
- Claim 20, line 1, before “extracting” insert **—preliminary—**.
- Claim 20, line 4, before “extracting” insert **—preliminary—**.
- Claim 21, line 1, delete **—process of—**.
- Claim 22, line 10, change “said windows” to **—said each window—**.
- Claim 22, line 13, before “extracting” insert **—preliminary—**.
- Claim 22, line 20 – 21, after “region” insert **—window—**.
- Claim 22, line 24, after “region” insert **—window—**.
- Claim 22, line 26 – 27, change “defect vector” to **—defect vectors—**.
- Claim 24, line 2, change “process” to **—said feature vectors—**.
- Claim 24, line 3, after “index” insert **—of feature vectors—**.
- Claim 24, line 4, change “features” to **—feature—**.
- Claim 25, line 2, change “process” to **—said feature vectors—**.
- Claim 27, line 1, before “extracting” insert **—preliminary—**.
- Claim 27, line 4, before “extracting” insert **—preliminary—**.
- Claim 28, line 1, delete **—process of—**.
- Claim 29, line 1, before “machine” insert **—a—**.
- Claim 29, line 11, before “extracting” insert **—preliminary—**.
- Claim 29, line 17 – 18, change “defect vector” to **—defect vectors—**.
- Claim 31, line 2, change “process” to **—said feature vectors—**.
- Claim 31, line 3, after “index” insert **—of feature vectors—**.
- Claim 31, line 4 – 5, change “features” to **—feature—**.
- Claim 32, line 2 – 3, change “process” to **—said feature vectors—**.
- Claim 34, line 2, before “extracting” insert **—preliminary—**.
- Claim 34, line 4, before “extracting” insert **—preliminary—**.
- Claim 35, line 2, delete **—process of—**.

Appropriate corrections are required.

Art Unit: 2825

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

5. Claims 1 – 7 and 29 – 35 are rejected under 35 U.S.C. 102(e) as being unpatentable over U.S. Patent No. 6, 650,779 B2 to Vachtesvanos et al.

6. As to Claim 1, Vachtesvanos et al. show and disclose the following subject matter:

- Method and apparatus for analyzing an image to detect and identify defects – [title; abstract]; Fault Detection and Identification (FDI) algorithms – [col. 1, line 30 – 67]; FDI can be used for detecting and identifying defects in types of products including in metals (e.g., metal image defects in integrated circuits);
- Performing preprocessing 55 and feature extraction 60 (i.e., preliminary extracting) and index processing of (metal) images of a (circuit layout) product – [Fig. 7; Fig. 8; Fig. 14; col. 14, line 6 – 61];
- Transforming geometric (metal) images (i.e., patterns/shapes) in a circuit layout product into feature vectors – [col. 14, line 6 – 61]; i is the image index (i.e., index of feature vectors)...feature vector(s) of i-th image – [col. 14, line 38 – 62]; Notice that (1) feature vector of a image (i.e., shape) includes many unique vector parametric information, which is extracted from the image under study – [col. 14, line 38 – 62] (2) each image index is associated with an unique feature image, it is produced based on comparison between features vectors extracted from a set of images (3) feature vectors are stored in a database – [Fig. 16; col. 14, line 45 – 46];
- Defect detection ...filter...determine existence of a defect – [col. 13, line 10 – 15]; Notice that defect detection filter is used in identifying a defect region of (circuit) layout under study through a process of feature searching;

Art Unit: 2825

- Extracting (defeat) images/shapes in a defect region and transforming the extracted into (defeat) images/shapes into (defeat) feature vectors – [Fig. 16];
- Pattern identification system is utilized to both detect and classify – [Fig. 7; col. 12, line 16 – 18]; Notice that similarities and difference between features vectors and defect vectors is achieved by the pattern identification system by retrieving information of feature vectors stored in the database using index of feature vectors – [Fig. 7; Fig. 16].

For reference purposes, the explanations given above in response to Claim 1 are called [Response A] hereinafter.

7. As to Claim 29, reasons are included in [Response A] given above.

8. As to Claims 2, 3, 30 and 31, reasons are included in [Response A] given above.

9. As to Claims 4 and 32, reasons are included in [Response A] given above. Notice that unique feature vectors stored in a database is achieved by eliminating redundant features vectors through performing sampling.

10. As to Claims 5 and 33, in addition to reasons included in [Response A] given above, Vachtesvanos et al. show and disclose maintaining coordinate information of features vectors within the (circuit) pattern layout in order to be captured by a CCD array camera– [Fig. 24, col. 32, line 53 – 60].

11. As to Claims 6, 7, 34 and 35, Vachtesvanos et al. disclose the subject matter regarding window sizes in Feature Extraction – [col. 14, line 5 – 62].

### ***Allowable Subject Matter***

12. Claims 8 – 28 are allowed. Those claims are allowed is because that the prior art does not teach or fairly suggest the following subject matter:

- A method of locating systematic defects in integrated circuits, said method comprising: transforming shapes in a circuit layout into feature vectors by finding intersections between basis patterns and said shapes in said circuit



Art Unit: 2825

layout and comparing said feature vectors to produce an index of feature vectors in combination with other limitations as recited in independent **Claim 8**;

- A method of locating systematic defects in integrated circuits, said method comprising: transforming shapes within each window of a window grid established for a circuit layout into feature vectors by finding intersections between basis patterns and said shapes in said each window and comparing said feature vectors to produce an index of feature vectors in combination with other limitations as recited in independent **Claim 15** and **Claim 22**, respectively.

### **Conclusion**

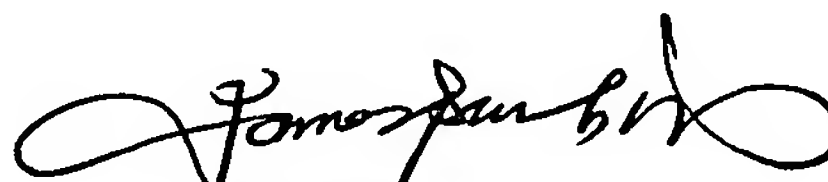
13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to *Sun James Lin* whose telephone number is (571) 272 - 1899. The examiner can normally be reached on Monday-Friday 9:30AM - 6:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, *Jack Chiang* can be reached on (571) 272 - 7483. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free) If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (in USA or CANADA) or 571-272-1000.

All responses to this Office Action should be mailed to **Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450** or faxed to **571-273-8300**.

Sun James Lin  
Primary Examiner  
Art Unit 2825

  
SUN JAMES LIN  
PRIMARY EXAMINER